What is claimed is:

1. An optical system for sensing net global motion components in a scattering medium, the optical system comprising:

(a) a laser probe source for producing a beam to illuminate said scattering medium;

(b) a wavefront-reversal device for collecting light propagated through said scattering medium and returning a conjugated beam; and

(c) an optical detector for detecting and processing said conjugated beam.

2. A system of claim 1 further comprising an amplifier for amplifying said beam after it propagates through said scattering medium before it enters said wavefront-reversal device.

3. A system of claim 2 where said wavefront-reversal device wherein said wavefront-reversal device is selected from the group consisting of a spatial light modulator, a self-pumped phase conjugated mirror and an externally pumped phase conjugated mirror.

4. A system of claim 3 further comprising a spatial domain enhancement apparatus disposed between the scattering medium and the wavefront-reversal device for imposing a more uniform spatial structure on the light which propagates through said scattering medium towards the wavefront-reversal device.

5. A system of claim 1 wherein said wavefront-reversal device is selected from the group consisting of a spatial light modulator, a self-pumped phase conjugated mirror and an externally pumped phase conjugated mirror.

6. A system of claim 5 further comprising a spatial domain enhancement apparatus disposed between the scattering medium and the wavefront-reversal device for imposing a more uniform spatial structure on the light which propagates through said scattering medium towards the wavefront-reversal device.

7. A system of claim 1 where said optical detector is a coherent detector.

8. A system of claim 7 where said coherent detector is a heterodyne detector.

9. A system of claim 7 where said coherent detector is a homodyne detector.

10. An optical system for suppressing noise components produced by a scattering medium, the optical system comprising:

(a) a laser probe source for producing a beam to illuminate said scattering medium;

(b) a phase-conjugate mirror for collecting light propagated through said scattering medium and returning a conjugated beam; and

(c) a coherent optical detector for detecting and processing said conjugated beam propagated through said scattering medium.

11. The optical system for suppressing noise components of claim 10 wherein the phase-conjugate mirror is self-pumped.

12. The optical system for suppressing noise components of claim 10 wherein the phase-conjugate mirror is externally pumped.

13. The optical system for suppressing noise components of claim 10 further comprising a spatial domain enhancement apparatus disposed between the scattering medium and the phase-conjugate mirror for imposing a more uniform spatial structure on the light which propagates through said scattering medium towards the phase-conjugate mirror.

14. A remote sensor comprising:

(a) a laser probe source for generating a beam to illuminate said scattering medium;

(b) a wavefront-reversal device for collecting light propagated through said scattering medium and returning a conjugated beam; and

(c) an optical detector for detecting and processing said conjugated beam reflected from said scattering medium.

15. A system of claim 14 further comprising an amplifier for amplifying said beam after it propagates through said scattering medium before it enters said wavefront-reversal device.

16. A system of claim 15 where said wavefront-reversal device wherein said wavefront-reversal device is selected from the group consisting of a spatial light modulator, a self-pumped phase conjugated mirror and an externally pumped phase conjugated mirror.

17. A system of claim 16 further comprising a spatial domain enhancement apparatus disposed between the scattering medium and the wavefront-reversal device for imposing a more

uniform spatial structure on the light which propagates through said scattering medium towards the wavefront-reversal device.

18. A system of claim 14 wherein said wavefront-reversal device is selected from the group consisting of a spatial light modulator, a self-pumped phase conjugated mirror and an externally pumped phase conjugated mirror.

19. A system of claim 18 further comprising a spatial domain enhancement apparatus disposed between the scattering medium and the wavefront-reversal device for imposing a more uniform spatial structure on the light which propagates through said scattering medium towards the wavefront-reversal device.

20. A system of claim 14 where said optical detector is a coherent detector.

21. A system of claim 20 where said coherent detector is a heterodyne detector.

22. A system of claim 20 where said coherent detector is a homodyne detector.

23. A method for sensing net global motion components in an ensemble of dynamically moving scattering sites, the method comprising the steps of:

(a) generating a output beam with a wavefront;

(b) passing said output beam through a scattering medium;

© forming a return beam with a wavefront from said output beam;

(d) wavefront matching said wavefront of the return beam to said wavefront of the output beam;

(e) passing said return beam through said scattering medium; and

(f) extracting desired motion component from said return beam.

24. A method for suppressing noise components produced by an ensemble of dynamically moving scattering sites, the method comprising the steps of:

(a) generating a probe beam;

(b) propagating said probe beam through said scattering medium;

(c) collecting light, via a wavefront-reversal device, propagated through said scattering medium and returning a conjugated beam;

(d) detecting said conjugated beam reflected from said scattering medium; and

(e) extracting desired motion component from said return beam.